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NOTICE OF ALLOWANCE AND FEE(S) DUE

26703

7590

09/08/2008

HARNES, DICKEY & PIERCE P.L.C.
5445 CORPORATE DRIVE
SUITE 200
TROY, MI 48098

EXAMINER

ZIA, SYED

ART UNIT

PAPER NUMBER

2131

DATE MAILED: 09/08/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/714,804

11/17/2003

Weishi Feng

MP0336

2955

TITLE OF INVENTION: DATA DEPENDENT SCRAMBLER WITH IMPROVED GLOBAL CONSTRAINT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$0	\$0	\$1440	12/08/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

26703 7590 09/08/2008
HARNES, DICKEY & PIERCE P.L.C.
5445 CORPORATE DRIVE
SUITE 200
TROY, MI 48098

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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nonprovisional	NO	\$1440	\$0	\$0	\$1440	12/08/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
ZIA, SYED	2131	714-807000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/714,804	11/17/2003	Weishi Feng	MP0336	2955
26703	7590	09/08/2008	EXAMINER	
HARNESS, DICKEY & PIERCE P.L.C. 5445 CORPORATE DRIVE SUITE 200 TROY, MI 48098			ZIA, SYED	
			ART UNIT	PAPER NUMBER
			2131	
DATE MAILED: 09/08/2008				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1145 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1145 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/714,804

Applicant(s)

FENG, WEISHI

Examiner

SYED ZIA

Art Unit

2131

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 07/21/2008.
2. ☒ The allowed claim(s) is/are 1-53.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 07/21/2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Syed Zia/
Primary Examiner, Art Unit 2131

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael D. Wiggins / Hemant Keskar (Reg. No. 34,764 / 61,776) and on August 27, 2008.

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A data dependent scrambler ~~for a communications channel~~ that receives a user data sequence including N symbols each with M bits, comprising: a seed finder that selects a scrambling seed; a first scrambler that receives said user data sequence and said scrambling seed from said seed finder and that generates a scrambled user data sequence; and

a first encoder that identifies a string of X consecutive zeros in adjacent symbols of said scrambled used data sequence, that replaces one of said adjacent symbols with an all-one symbol, and that replaces the other of said adjacent symbols with first bits representing a position of said string of X consecutive zeros and second bits representing bits of said adjacent symbols that are not in said string of X consecutive zeros.

2. (Original) The data dependent scrambler of Claim 1 wherein $X > M$.
3. (Original) The data dependent scrambler of Claim 1 wherein both of said symbols are not all-zero.
4. (Original) The data dependent scrambler of Claim 1 wherein said seed finder selects said scrambling seed based upon said symbols in said user data sequence.
5. (Original) The data dependent scrambler of Claim 1 wherein $X = 12$ and $M=10$.
6. (Original) The data dependent scrambler of Claim 1 wherein said start position is identified using Y least significant bits of said second symbol.
7. (Original) The data dependent scrambler of Claim 6 wherein $Y = 3$.
8. (Original) The data dependent scrambler of Claim 1 further comprising:

an H-code token finder that generates an H-code token that is dependent upon said symbols in said user data sequence; and

an H-code encoder that receives said scrambled user data sequence from said scrambler, that increases a Hamming weight of said scrambled user data sequence using said H-code token and that outputs said scrambled user data to said encoder.

9. (Original) The data dependent scrambler of Claim 1 wherein said data dependent scrambler is implemented in a write path of a data storage system.

10. (Original) The data dependent scrambler of Claim 1 wherein said scrambler performs a bitwise exclusive (XOR) operation.

11. (Currently Amended) A ~~communications channel~~ system that receives a user data sequence including N symbols each with M bits, comprising:

a host bus interface (HBI) that receives said user data sequence;

a data dependent scrambler that scrambles said user data sequence, including:

a seed finder that selects a scrambling seed; a first scrambler that receives said user data sequence and said scrambling seed from said seed finder and that generates a scrambled user data sequence; and

a first encoder that identifies a string of X consecutive zeros in adjacent symbols of said scrambled user data sequence, that replaces one of said adjacent symbols with an all-one symbol, and that replaces the other of said adjacent symbols with first bits representing a position

of said string of X consecutive zeros and second bits representing bits of said adjacent symbols that are not in said string of X consecutive zeros.

12. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein $X > M$.

13. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein both of said symbols are not all-zero.

14. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein said seed finder selects said scrambling seed based upon said symbols in said user data sequence.

15. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein $X = 12$ and $M = 10$.

16. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein said start position is identified using Y least significant bits of said second symbol.

17. (Currently Amended) The ~~communications channel~~ system of Claim 16 wherein $Y = 3$.

18. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein said data dependent scrambler further comprises:

an H-code token finder that generates an H-code token that is dependent upon said symbols in

said user data sequence; and

an H-code encoder that receives said scrambled user data sequence from said scrambler, that increases a Hamming weight of said scrambled user data sequence using said H-code token and that outputs said scrambled user data to said encoder.

19. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein said communications channel is a write path of a data storage system.

20. (Currently Amended) The ~~communications channel~~ system of Claim 11 wherein said scrambler performs a bitwise exclusive (XOR) operation.

21. (Currently Amended) The ~~communications channel~~ system of Claim 11 further comprising an error correction coding (ECC) and cyclical redundancy check (CRC) encoder that encodes said scrambled user data sequence and appends ECC and CRC bits to said scrambled user data sequence.

22. (Currently Amended) The ~~communications channel~~ system of claim 21 further comprising a run length limited (RLL) encoder that encodes said ECC and CRC bits and appends RLL bits to said scrambled user data sequence.

23. (Currently Amended) A data dependent scrambler ~~for a communications channel~~ that receives a user data sequence including N symbols each with M bits, comprising: seed

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finding means for selecting a scrambling seed;

first scrambling means for receiving said user data sequence and said scrambling seed and for generating a scrambled user data sequence; and

first encoding means for identifying a string of X consecutive zeros in adjacent symbols of said scrambled user data sequence, for replacing one of said adjacent symbols with an all-one symbol, and for replacing the other of said adjacent symbols with first bits representing a position of said string of X consecutive zeros and second bits representing bits of said adjacent symbols that are not in said string of X consecutive zeros.

24. (Original) The data dependent scrambler of Claim 23 wherein $X > M$.

25. (Original) The data dependent scrambler of Claim 23 wherein both of said symbols are not all-zero.

26. (Original) The data dependent scrambler of Claim 23 wherein said seed finding means selects said scrambling seed based upon said symbols in said user data sequence.

27. (Original) The data dependent scrambler of Claim 23 wherein $X = 12$ and $M = 10$.

28. (Original) The data dependent scrambler of Claim 23 wherein said start position is identified using Y least significant bits of said second symbol.

29. (Original) The data dependent scrambler of Claim 28 wherein $Y = 3$.

30. (Original) The data dependent scrambler of Claim 23 further comprising:
token finding means for generating a token that is dependent upon said
symbols in said user data sequence; and
second encoding means for receiving said scrambled user data sequence from said scrambling
means, for increasing a Hamming weight of said scrambled user data sequence using said token
and for outputting said scrambled user data to said first encoding means.

31. (Original) The data dependent scrambler of Claim 23 wherein said data dependent scrambler
is implemented in a write path of a data storage system.

32. (Original) The data dependent scrambler of Claim 23 wherein said scrambling means
performs a bitwise exclusive (XOR) operation.

33. (Currently Amended) A ~~communications channel~~ system that receives a user data sequence
including N symbols each with M bits, comprising:
interface means for receiving said user data sequence;
data dependent scrambling means for scrambling said user data sequence, including:
seed finding means for selecting a scrambling seed; first scrambling means for receiving said
user data sequence and said scrambling seed from said seed finder and for generating a

scrambled user data sequence; and

first encoding means for identifying a string of X consecutive zeros in adjacent symbols of said scrambled user data sequence, for replacing one of said adjacent symbols with an all-one symbol, and for replacing the other of said adjacent symbols with first bits representing a position of said string of X consecutive zeros and second bits representing bits of said adjacent symbols that are not in said string of X consecutive zeros.

34. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein $X > M$.

35. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein both of said symbols are not all-zero.

36. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein said seed finding means selects said scrambling seed based upon said symbols in said user data sequence.

37. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein $X = 12$ and $M = 10$.

38. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein said start position is identified using Y least significant bits of said second symbol.

39. (Currently Amended) The ~~communications channel~~ system of Claim 38 wherein $Y = 3$.

40. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein said data dependent scrambling means further comprises:
token finding means for generating a token that is dependent upon said symbols in said user data sequence; and
second encoding means for receiving said scrambled user data sequence from said scrambler, for increasing a Hamming weight of said scrambled user data sequence using said token and for outputting said scrambled user data to said first encoding means.

41. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein said ~~communications channel~~ system includes is a write path of a data storage system.

42. (Currently Amended) The ~~communications channel~~ system of Claim 33 wherein said scrambling means performs a bitwise exclusive (XOR) operation.

43. (Currently Amended) The ~~communications channel~~ system of Claim 33 further comprising error correction coding (ECC) and cyclical redundancy check (CRC) encoding means for encoding said scrambled user data sequence and for appending ECC and CRC bits to said scrambled user data sequence.

44. (Currently Amended) The ~~communications channel~~ system of claim 43 further comprising

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run length limited (RLL) encoding means for encoding said ECC and CRC bits and for appending RLL bits to said scrambled user data sequence.

45. (Original) A method of scrambling a user data sequence including N symbols each with M bits, comprising:

selecting a scrambling seed;

generating a scrambled user data sequence based on said user data sequence and said scrambling seed;

identifying a string of X consecutive zeros in adjacent symbols of said scrambled user data sequence;

replacing one of said adjacent symbols with an all-one symbol; and

replacing the other of said adjacent symbols with first bits representing a position of said string of X consecutive zeros and second bits representing bits of said adjacent symbols that are not in said string of X consecutive zeros.

46. (Original) The method of Claim 45 wherein $X > M$.

47. (Original) The method of Claim 45 wherein both of said symbols are not all-zero.

48. (Original) The method of Claim 45 wherein said scrambling seed is based upon said symbols in said user data sequence.

49. (Original) The method of Claim 45 wherein $X = 12$ and $M=10$.

50. (Original) The method of Claim 45 further comprising identifying said start position using Y least significant bits of said second symbol.

51. (Original) The method of Claim 50 wherein $Y = 3$.

52.(Original) The method of Claim 45 further comprising:
generating an H-code token that is dependent upon said symbols in said
user data sequence; and
increasing a Hamming weight of said scrambled user data sequence using said H-code token.

53. (Original) The method of Claim 45 wherein said step of scrambling includes performing a bitwise exclusive (XOR) operation.

54.-79. (Cancelled).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SYED ZIA whose telephone number is (571)272-3798. The examiner can normally be reached on 9:00 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

sz
August 27, 2008

/Syed Zia/
Primary Examiner, Art Unit 2131